PHANTOM TRANSPOSITIONS—PLATE TYPE.

1. GENERAL.

1.1 Phantom transpositions in trunk lines constructed of all classes of wire and of gauges up to and including 300 lb. per mile shall be made by means of phantom transposition plates and associated fittings in the manner illustrated in Figures 1-4. For circuits composed of heavier wires than 300 lb. per mile, formed bar transpositions shall be used.

1.2 On transpositions made with these plates the wire spacing is set at 9 inches. The plates shall also be used on 14-inch spaced circuits in which case the wires will converge slightly in the spans adjacent to the transposition pole.

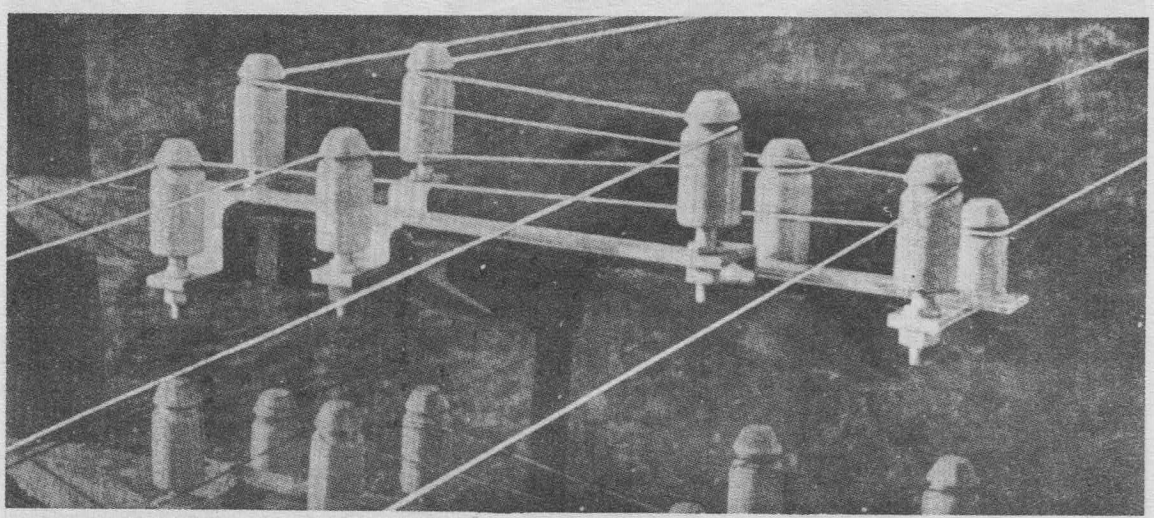


Fig. 1. TYPE 1—PHANTOM TRANSPOSITION.

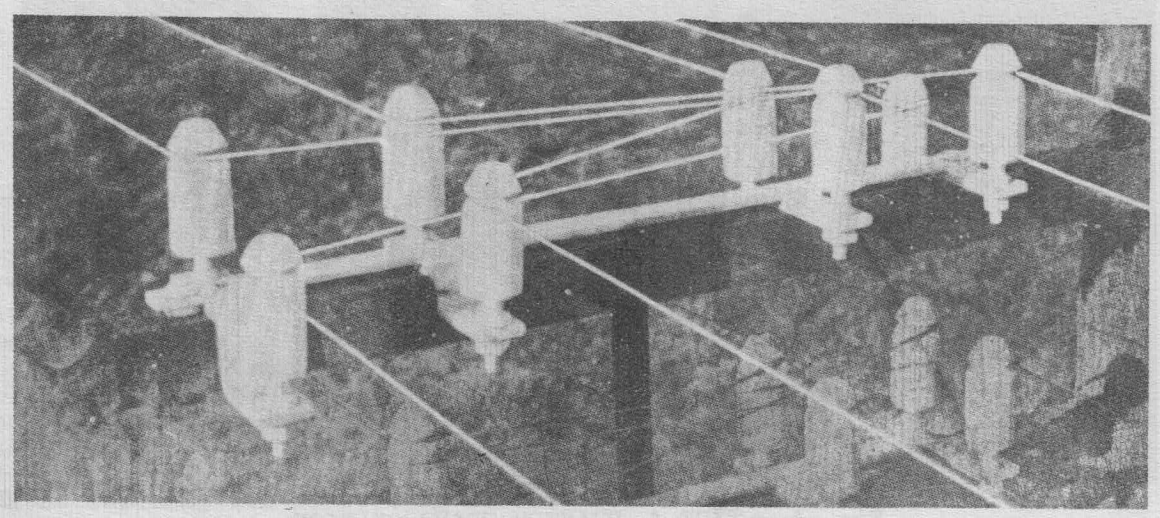


Fig. 2. TYPE 2—PHANTOM TRANSPOSITION.

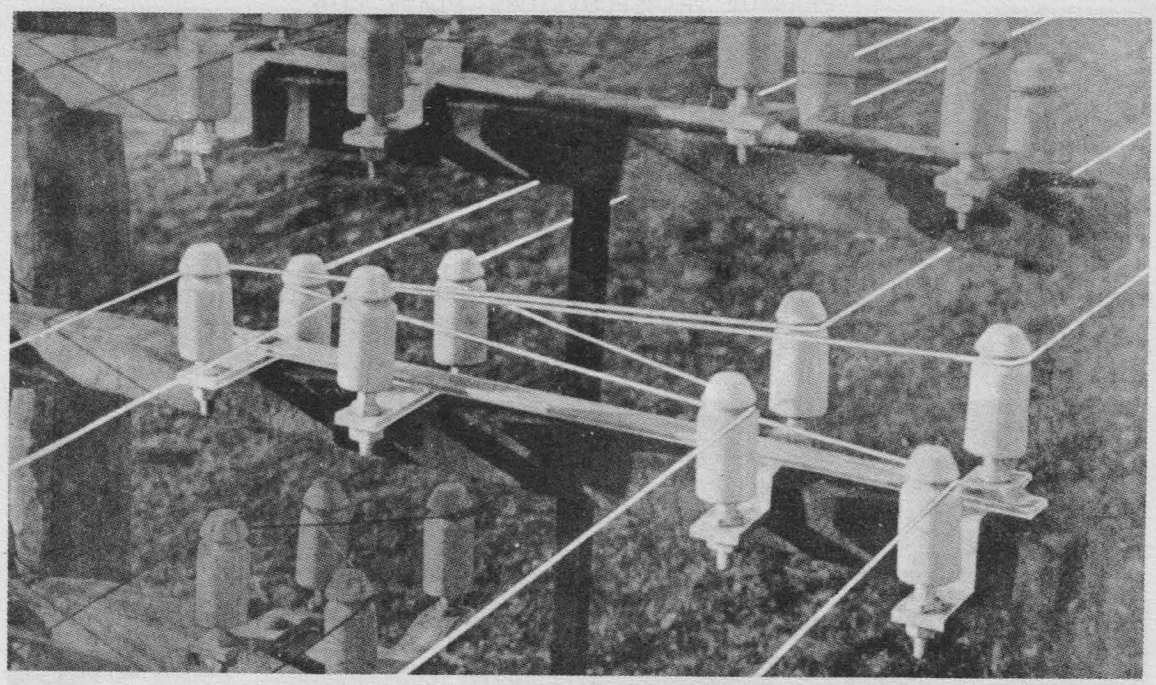


Fig. 3. TYPE 3—PHANTOM TRANSPOSITION.

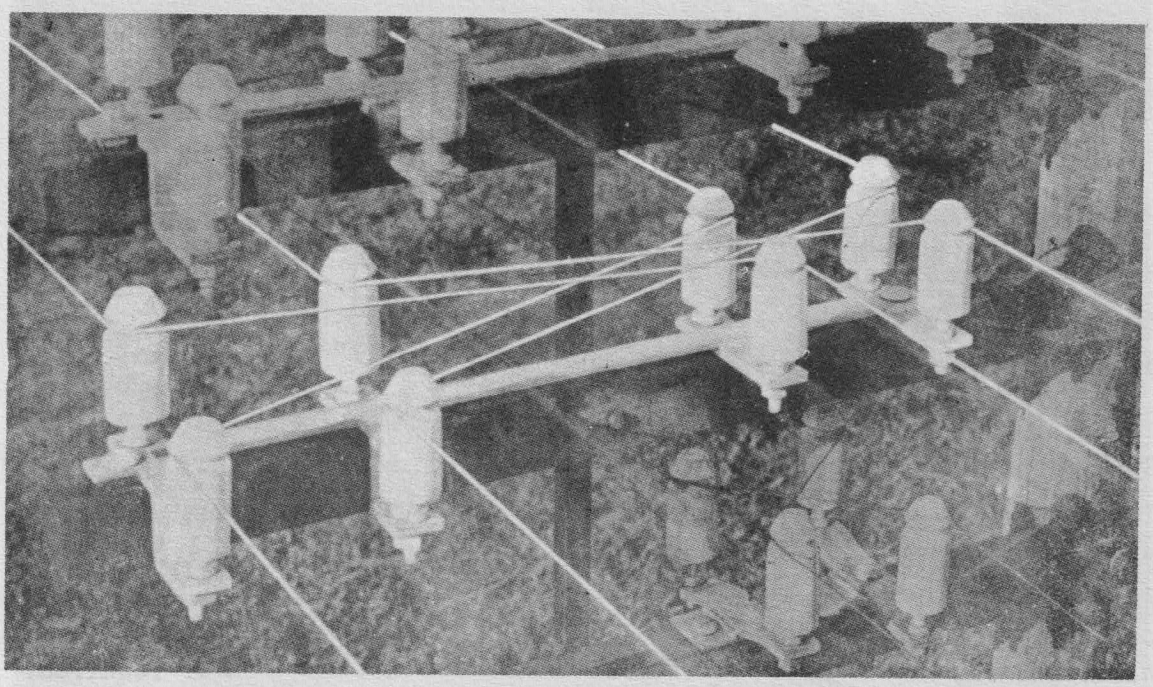


Fig. 4. TYPE 4—PHANTOM TRANSPOSITION.

2. MATERIAL.

2.1 Each transposition plate consists of a centre plate below which are welded four cross brackets each of which will hold two steel spindles in the positions required for making the transposition. The plate includes also two 4½-inch x ⅝-inch cup-headed bolts with square necks, and one square collar. These additional fittings are required to secure the transposition plate to the crossarm.

2.2 There are four types of phantom transposition plates, one for each type of phantom transposition. They are designated—Plate, Transposition PN., followed by the appropriate number of the transposition type, e.g., Plate, Transposition PN. 1 is used for making Type 1 phantom transpositions. The types of transposition plates are distinguished by the number which is stamped on the upper surface of the centre plate (See Fig. 5).

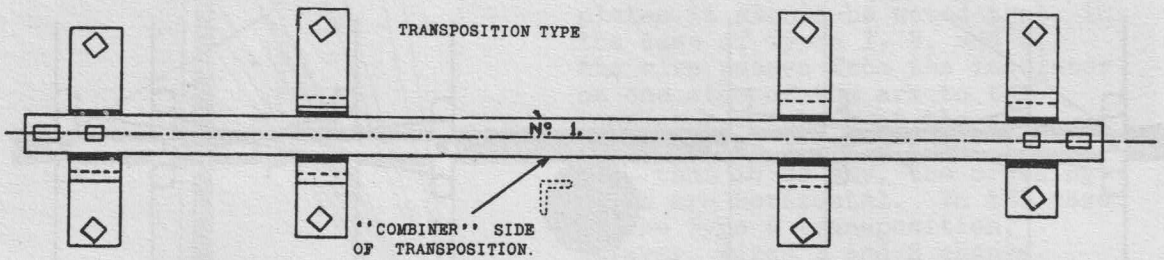


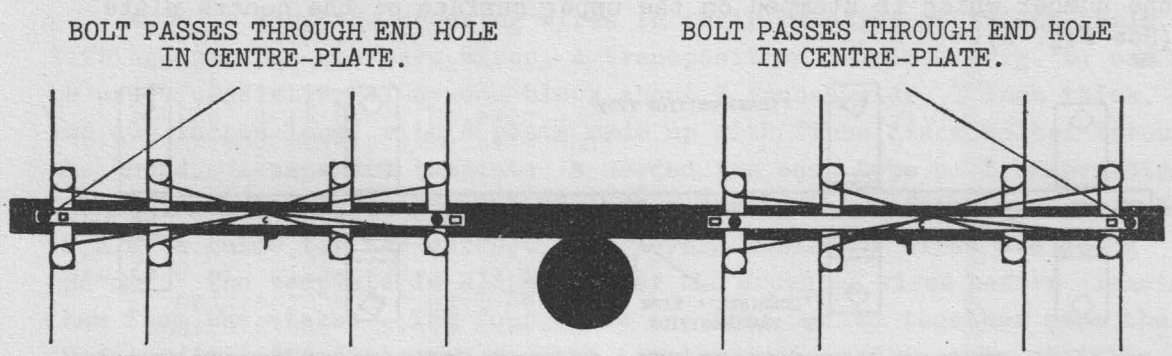
Fig. 5. SHOWING MARKINGS STAMPED ON UPPER SURFACE OF CENTRE MEMBERS.

2.3 For each transposition the following items of material are required:-

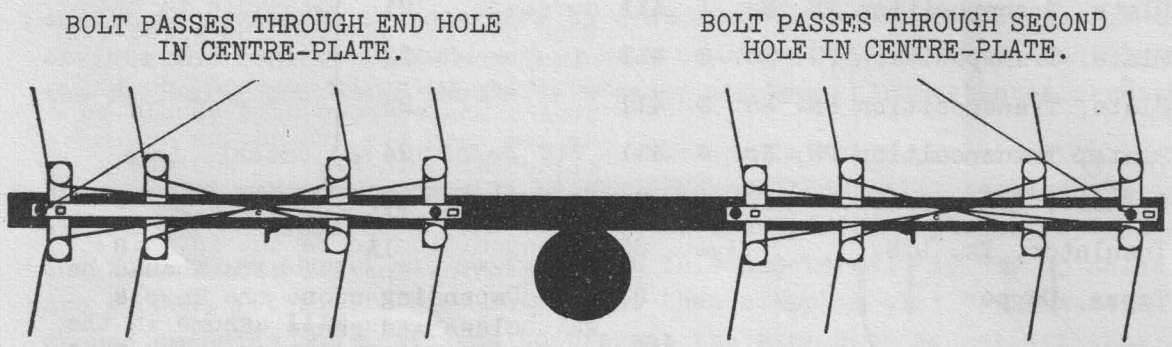
Title	Serial No.	Item No.	Quantity per Transposition
Plate, Transposition PN. No. 1	411	21	1
Plate, Transposition PN. No. 2	411	22	
Plate, Transposition PN. No. 3	411	23	
Plate, Transposition PN. No. 4	411	24	
Spindle, Transposition	71	18	8
Insulator, Tk. L.S.	65	1A	8
Tapes, Copper	63	Depending upon class and gauge of wire	8
Wire, Binding	61	do.	If required. (See para. 6).

3. FITTING.

3.1 The phantom transposition plate is fitted with the centre-plate along the crossarm in the manner illustrated in Fig. 6. In order to avoid fitting the plate upside down, care should be taken to see that the transposition number mark is uppermost. The plates are to be fitted facing the same direction for either side of the pole, and careful note should be taken of the manner in which the projecting portion of the centre plate is fitted. The rule is that the bolt passing through the spindle hole at the extreme end of the arm shall also pass through the hole at the extreme end of the centre-plate except at angles, where a plate fitted on the ''outside'' position on the arm shall be shifted out towards the end of the arm so that the bolt passing through the hole in the end of the arm passes through the second hole on the centre-plate.



PHANTOM TRANSPOSITION ON ''STRAIGHT'' POLE.



PHANTOM TRANSPOSITION ON ANGLE POLE.

Fig. 6. POSITIONS OF TRANSPOSITION PLATES.

3.2 It should be noted that the fitting of the transposition plate is dependent on the side of the crossarm to which the combiner is attached but is independent of the direction of the transposition. On the upper surface of the centre member is stamped the letter C (see Fig. 5). The plate should be so set on the crossarm that this letter is on the same side of the crossarm as the combiner. If this is done, the crossing wires will have adequate clearance from the combiner, but if it is not done, then the crossing wires will either foul the combiner or approach too close to it.

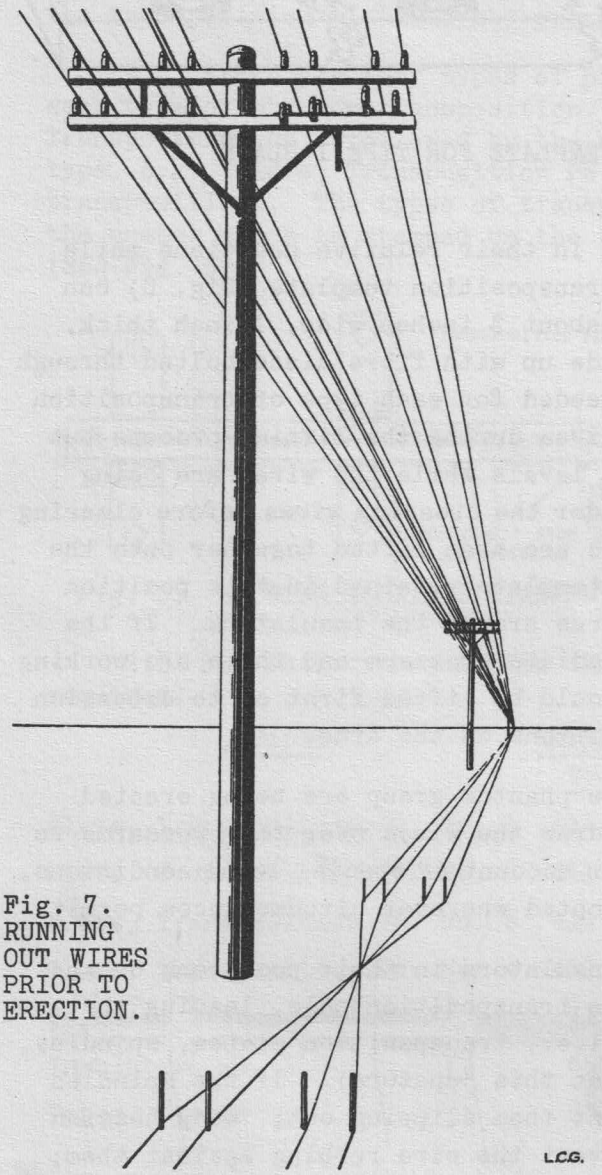


Fig. 7. RUNNING OUT WIRES PRIOR TO ERECTION.

3.3 The plates are designed for use on arms bored for 9 inch-19 inch-9 inch spacing but should also be used on arms bored for 14-inch spacing, in which case it will be necessary to bore an 11/16-inch hole at 37-inch centres from the hole nearest the end of the crossarm.

4. ERECTION OF WIRES.

4.1 When fitting wires around phantom transposition plates it should be noted that, in the case of Types 1, 2, and 3, the wire passes from the insulator on one side of the arm to the insulator which is at the same level on the other side of the arm, that is to say, the crossing wires are horizontal. In the case of the Type 4 transposition, however, wires 1 and 2 change level but wires 3 and 4 maintain the same level. The arrangement should be clear by reference to Figures 4 and 10.

4.2 When four new wires which are to be phantom transposed with this form of transposition can be run out along the ground before being lifted onto the crossarm, it is advisable to use four barrows and run the wires out simultaneously. When a transposition point is reached, 8 stakes in two rows of 4 should be driven into the ground, as illustrated in Fig. 7, and the wires taken around them in accordance with the type of transposition to be cut in. In doing this, special care should be taken with regard to the levels which the wires will assume in the completed transposition. The wire or wires which occupy the lowest level on the transposition should be taken around the stakes first, then the wire or wires occupying the second level should be taken around, and so on. (See Fig. 10 for the order of running out the wires.)

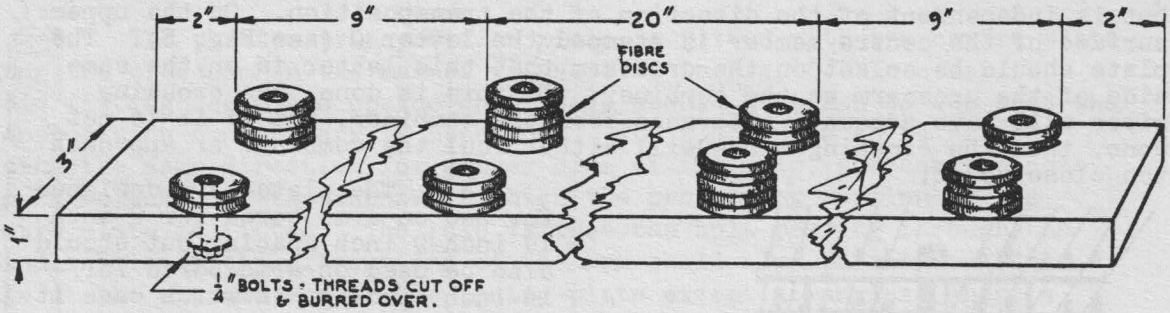


Fig. 8. TRANSPOSITION TEMPLATE FOR TYPE 1 PLATE.

4.3 To keep the crossing wires in their relative positions while lifting onto the crossarm wires, a transposition template (Fig. 8) can be used, consisting of a wood block about 3 inches wide, 1 inch thick, and 40¾ inches long, with 8 posts made up with fibre discs bolted through the board. A separate template is needed for each type of transposition and serves not only to support the wires during the lifting process but is also a guide for the correct wire levels while the wires are being run out. The template is slipped under the crossing wires before clearing them from the stakes. The four wires are then lifted together onto the crossarms or extension arms and the template retained in this position until it is convenient to fit the wires around the insulators. If the wires are being erected on an intermediate crossarm and there are working circuits on lower arms, the wires should be lifted first on to extension arms and then into their correct positions on the arms.

4.4 Where the four wires of the phantom group are being erected and it is advisable or necessary to draw the wires over the crossarms to obviate the removal of combiners or on account of special local conditions, the following procedure should be adopted wherever circumstances permit.

4.41 Insert the spindles and insulators in their positions on the arms on the poles on each side of the transposition pole, leaving the arm on the transposition pole bare (i.e., transposition plates, spindles, and insulators should not be fitted at this juncture). If the spindles are wooden, fit toggle pins to prevent them slipping out; wrap hessian around spindles and crossarms to prevent the wire rubbing against them; also wrap the combiner on the transposition pole with hessian. See Fig. 9.

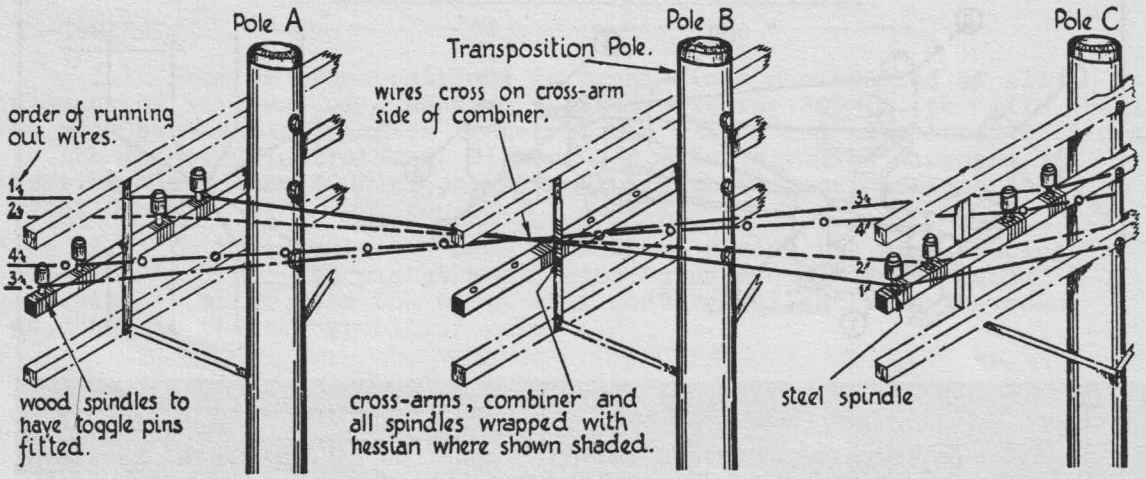


Fig. 9. MAKING TRANSPOSITIONS WHEN RUNNING OUT WIRES OVER CROSSARMS.

4.42 The order in which the wires should be run out for each type of transposition is shown in Fig. 10. The order can be readily memorized if it is noted that the order of running is 1, 2, 4, 3, counting from left to right in all cases except Type 3 transposition, in which case the counting is from right to left. It should be noted that the order of running applies irrespective of which direction the wires are being pulled, provided all four are pulled in the same direction.

4.43 Draw the first wire around the spindle on pole A (Fig. 9), then over the arm on pole B (taking care to keep on the correct side of the combiner) and then around the correct spindle on pole C. The wires should cross on the same side of the combiner on pole B as the arm. Draw the remaining wires out in a similar manner.

4.44 It is advisable to draw all four wires past the first transposition before attempting to draw any past a second transposition.

4.45 After the wires have been completely drawn out, fit the transposition plate or plates complete with insulators and spindles on the crossarm at the transposition pole, then pull the wires around the correct insulators. It will be necessary to pull up some slack to enable this to be done.

4.5 The method described in Para. 4.4 is liable to cause interference to wires on lower arms and if there are any important circuits on them it may be advisable to draw the wires straight past the transpositions, keeping them close to the pole or the combiner so as to avoid as much as possible the danger of contacting with lower wires. It will then be necessary to cut and cross connect each wire after the transposition plates have been fitted. Enough slack to make the cross-connexion with only one joint in each wire should be left when the wire is run out in the first instance. The slack for this purpose should be left in a ''bite'' at the transposition in such a manner that it is not likely to cause interruption to working circuits. The wires should be cut and joined in the order set down for running out in Fig. 10.

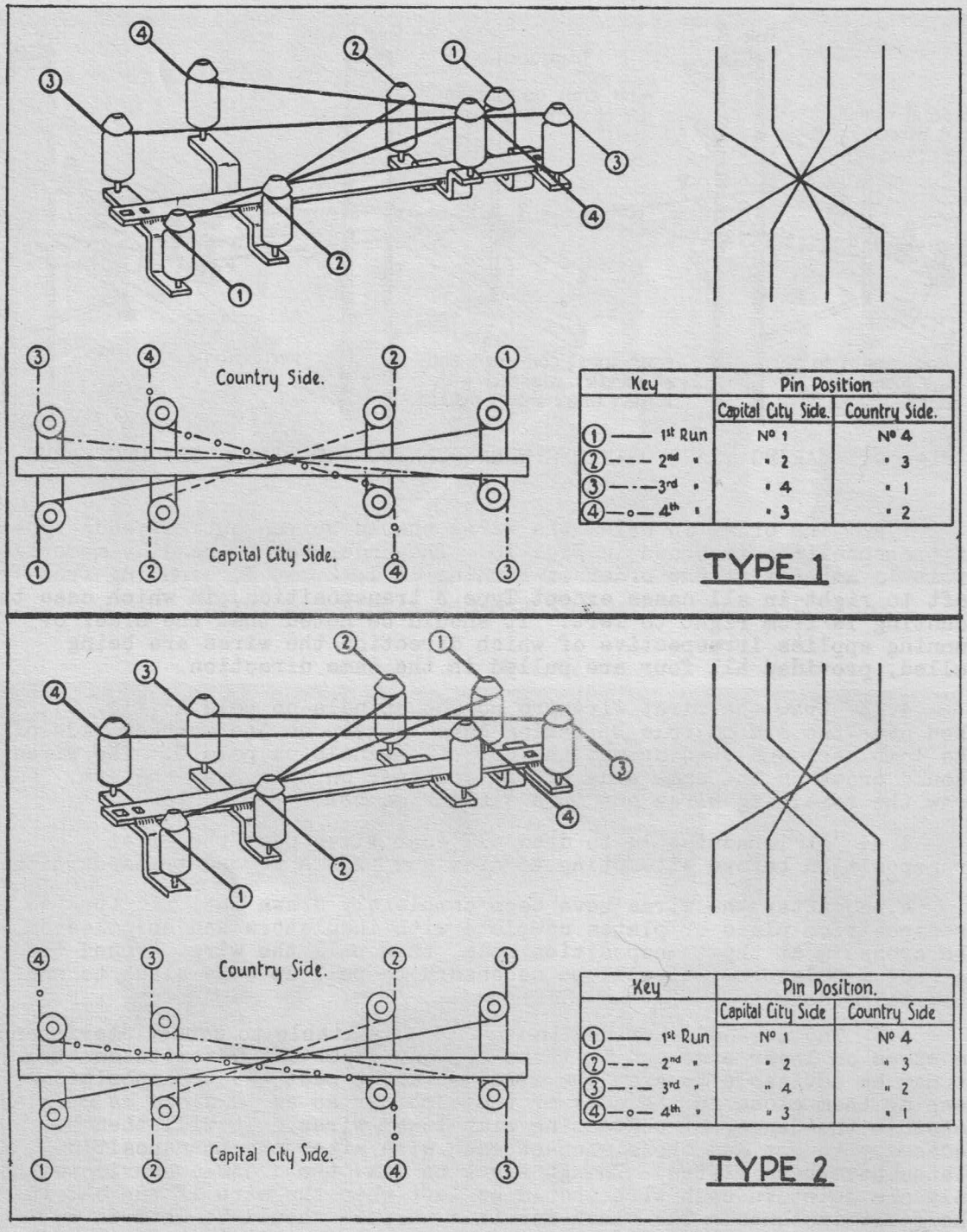


Fig. 10. ORDER OF RUNNING OUT WIRES.

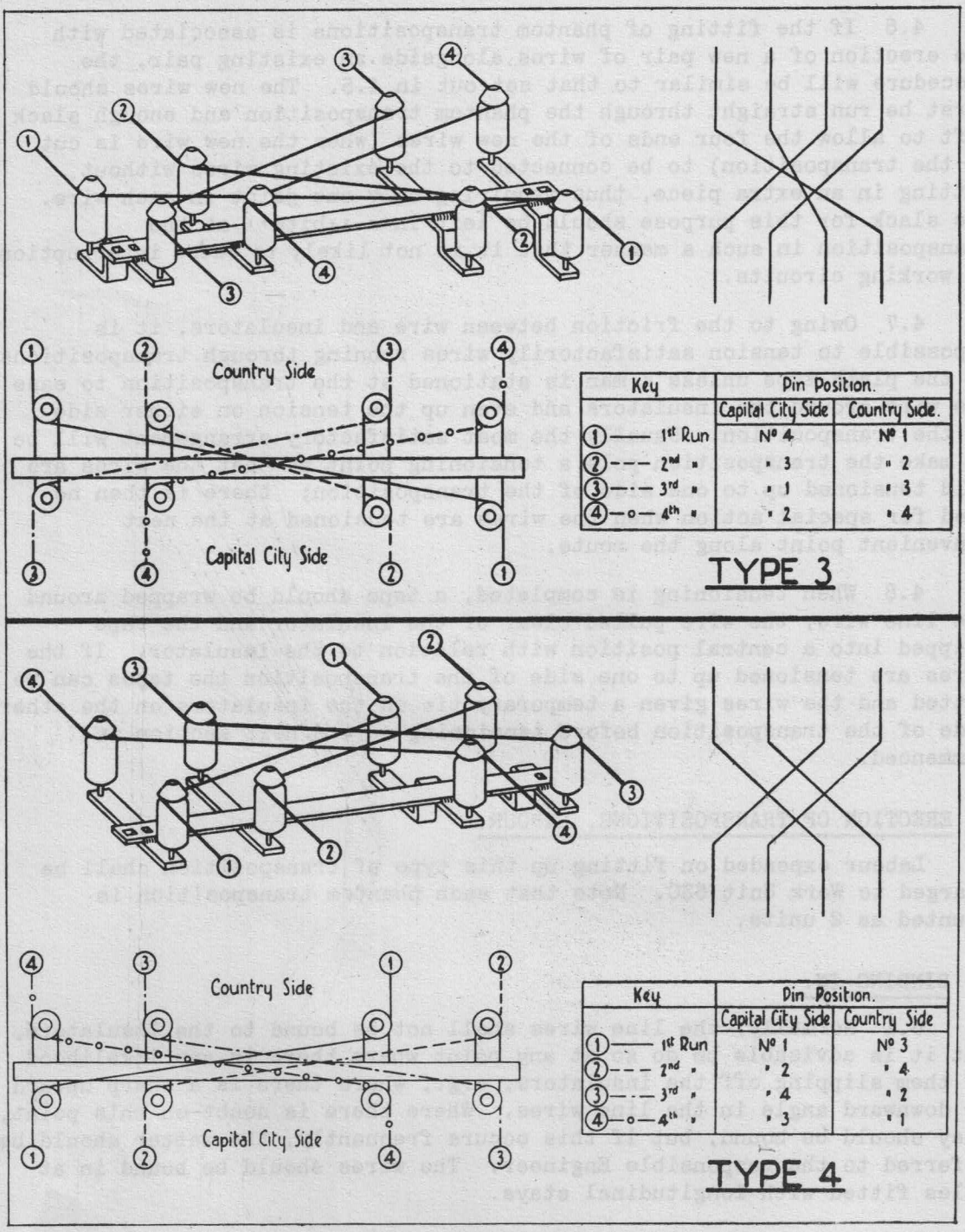


Fig. 10 (continued). ORDER OF RUNNING OUT WIRES.

4.6 If the fitting of phantom transpositions is associated with the erection of a new pair of wires alongside an existing pair, the procedure will be similar to that set out in 4.5. The new wires should first be run straight through the phantom transposition and enough slack left to allow the four ends of the new wires (when the new wire is cut at the transposition) to be connected to the existing wires without cutting in an extra piece, thus requiring only one joint in each wire. The slack for this purpose should be left in a ''bite'' at the transposition in such a manner that it is not likely to cause interruption to working circuits.

4.7 Owing to the friction between wire and insulators, it is impossible to tension satisfactorily wires running through transpositions of the plate type unless a man is stationed at the transposition to ease the wire around the insulators and even up the tension on either side of the transposition. Usually the most satisfactory arrangement will be to make the transposition pole a tensioning point so that the wires are held tensioned up to one side of the transposition; there is then no need for special action when the wires are tensioned at the next convenient point along the route.

4.8 When tensioning is completed, a tape should be wrapped around the line wire, the wire pulled clear of the insulator and the tape slipped into a central position with relation to the insulator. If the wires are tensioned up to one side of the transposition the tapes can be fitted and the wires given a temporary tie on the insulators on the other side of the transposition before tensioning on the next section is commenced.

5. ERECTION OF TRANSPOSITIONS, LABOUR.

Labour expended on fitting up this type of transposition shall be charged to Work Unit 63C. Note that each phantom transposition is counted as 2 units.

6. BINDING-IN.

6.1 Normally, the line wires shall not be bound to the insulators, but it is advisable to do so at any point where there is any likelihood of them slipping off the insulators, e.g., where there is a sharp upward or downward angle in the line wires. Where there is doubt on this point, they should be bound, but if this occurs frequently, the matter should be referred to the responsible Engineer. The wires should be bound in at poles fitted with longitudinal stays.

END.